

Revised Key to the Nearctic Species of *Chrysocharis* Förster (Hymenoptera: Eulophidae), Including Three New Species

CHRISTER HANSSON

Department of Systematic Zoology, Lund University, Helgonavägen 3, S-223 62 Lund, Sweden

Abstract.—The Nearctic species of *Chrysocharis* are keyed, altogether 63 species. The paper includes the description of three new species: *wahli*, *cornigera*, *sentenaca* and two new combinations from *Chrysocharis* to *Omphale* Haliday: *varia* Hansson, *gracilicornis* Hansson.

The Nearctic and Neotropical species of *Chrysocharis* were revised by Hansson (1987). Sixtyone (61) species were treated and 18 of the species were described as new. From the Nearctic region 57 species were recognized. However, the key for the identification of the species is difficult and laborious to use, mainly because too many characters are used under each item, and characters used in the two alternatives under each item are not always exclusively the same. To improve the key I have rearranged it so that the most obvious characters are used first, and under each item only 1–2 characters are used—only occasionally are more than two characters used. The characters selected are those easy to see and that vary as little as possible. In some cases a species varies in characters used, and this species is found under both alternatives.

In the revised key I have also included changes that has taken place since the publication of the previous key: *Entedon imbrusus* Walker has been transferred to *Chrysocharis* from *Neochrysocharis* Kurdjumov (Hansson in press); the species treated as *Zaommomyia* Girault by Hansson (1986) have been transferred to *Chrysocharis* (Schauff 1991). The three species described as new in this paper are also included. Furthermore, two species regarded as *Chrysocharis* by Hansson (1987) are hereby transferred to *Omphale* Haliday: *gracilicornis* Hansson, *varia* Hansson, both *n. comb.*

The page number after each species in the revised key refers to Hansson (1987). The descriptions, diagnoses, distribution and hosts of Nearctic species of *Chrysocharis* are found in Hansson (1985, 1986, 1987).

RECOGNIZING *CHRYSOCHARIS*

To facilitate the recognition of *Chrysocharis*, following should be helpful. Antenna with apical two segments fused, or with all flagellar segments free (exception: *imbrusus* with three apical segments fused, recognized as a *Chrysocharis* through the long postmarginal vein—1.5× stigmal vein—and antennal scrobes join below frontal suture in female). Clypeus not delimited (exception: *flaviclypeus*, recognized as a *Chrysocharis* through female antennal scrobes that join below frontal suture). Postmarginal vein longer than stigmal vein (exception *wahli* & *cornigera*, recognized as members of *Chrysocharis* through the possession of the three abovementioned characters). Without a sulcus surrounding ocellar triangle (this separates *Chrysocharis* from *Derostenus*).

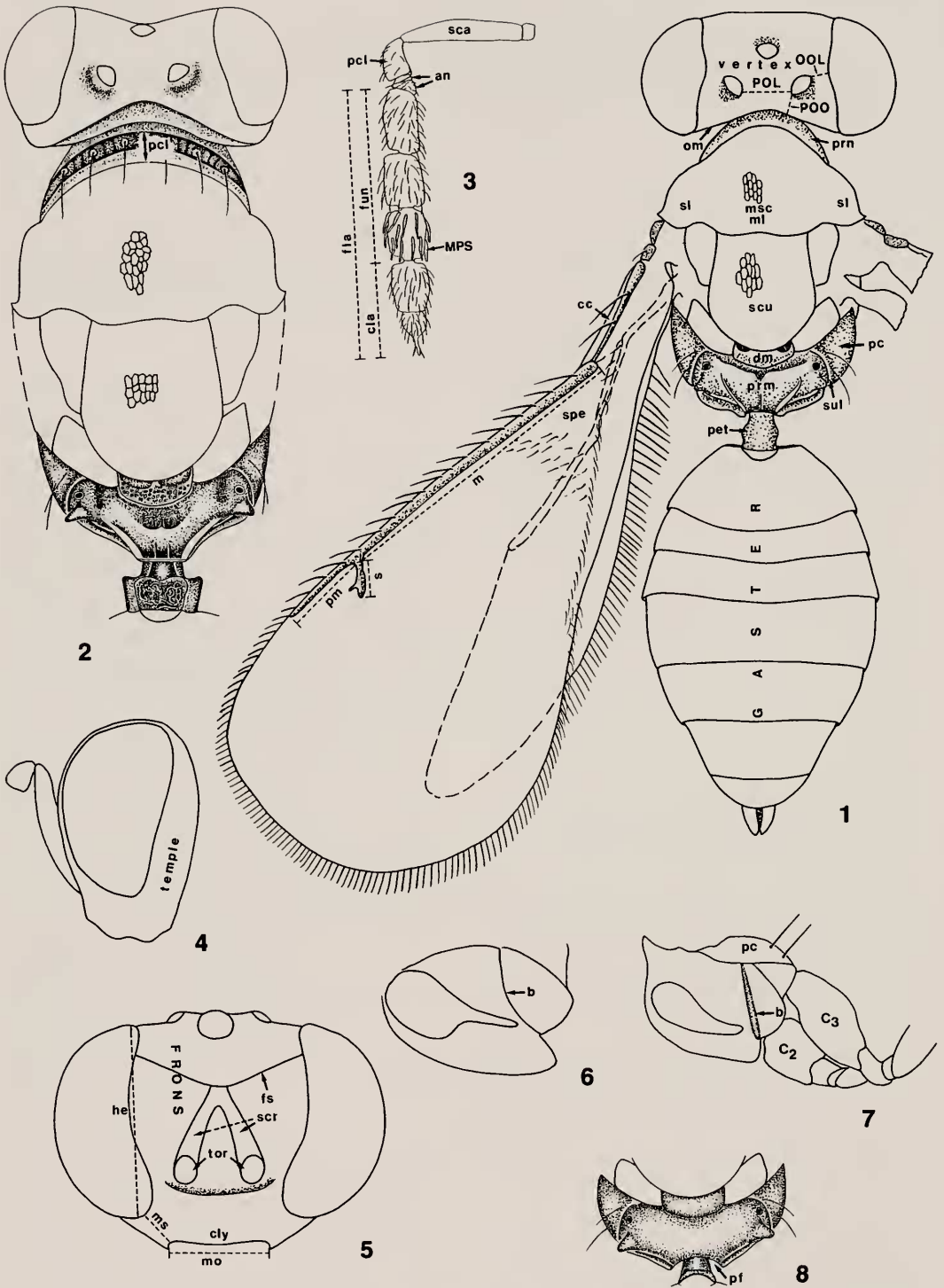
TERMINOLOGY AND ABBREVIATIONS

The terms used in the key and in the text are indicated on Figs 1–8.

Abbreviations of collections: CNC= Canadian National Collection of Insects and Arachnids, Ottawa; LUZM= Lund University Zoological Museum; TAMU= Texas A&M University, College Station.

KEY TO NEARCTIC SPECIES OF *CHRYSOCHARIS*

- 1. Flagellum with all five segments free (e.g. Figs 35, 39) 2
 - Flagellum with apical two or three segments fused, i.e. the constrictions between the basal funicular segments are narrower than the constrictions between the apical segments (e.g. Figs 37, 38) 19
- 2. Forewing with a complete row of setae on underside of costal cell (Figs 48, 49) 3
 - Costal cell without row of setae 4
- 3. Forewing speculum closed (Fig. 49); 5th flagellar segment (including the narrow tip) 1.3× as long as 4th segment (Fig. 35) *C. chilo* (Walker) (female, male) p. 30
 - Forewing speculum open laterally (Fig. 48); 5th flagellar segment 0.9–1.0× as long as 4th segment (Fig. 36) *C. pilosa* Delucchi (female, male unknown) p. 30
- 4. Pronotal collar with a transverse carina—at least on median pronotum—parts of pronotum behind carina smooth and shiny (Fig. 87) 5
 - Pronotum without transverse carina, hind margin of pronotum at most with a very narrow smooth strip (Fig. 86) 7
- 5. Petiole longer than wide (Fig. 62) *C. acoris* (Walker) (female, male) p. 64
 - Petiole at most as long as wide (Figs 56, 59) 6
- 6. Scape and pedicel bright orange-yellow; clypeus pale yellow
 - *C. illustris* Graham (male) p. 59
 - Scape whitish or pale brown, pedicel brown; clypeus metallic bluish-green
 - *C. occidentalis* (Girault) (female, male) p. 54
- 7. Propodeal callus with 2 setae 8
 - Propodeal callus with at least 3 setae 14
- 8. Petiole pale; male flagellar segments with a single whorl of setae at the base of each segment (Fig. 42) *C. beckeri* Yoshimoto (female, male)
 - Petiole dark; male flagellar segments also with setae in middle and at apex 9
- 9. Propodeum with 2 complete and parallel submedian grooves (Fig. 84)
 - *C. sulcata* (Hansson) (female, male)
 - Propodeum without such grooves 10
- 10. Forewing speculum open below (Fig. 47) *C. vonones* (Walker) (female, male)
 - Forewing speculum closed below 11
- 11. Scape bright orange-yellow; reticulation on thoracic dorsum fine and engraved
 - *C. fulviscapus* Hansson (male, female unknown) p. 45
 - Scape whitish or brown; reticulation on thoracic dorsum raised and strong 12
- 12. Occipital margin with a complete (reaching from eye to eye), high and sharp carina (Fig. 91); frontal suture raised *C. liriomyzae* Delucchi (male) p. 26
 - Occipital margin without a complete carina; frontal suture not raised 13
- 13. All femora predominantly dark *C. phytomyzivora* Hansson (male) p. 20
 - Femora pale *C. cerodonthae* Hansson (male) p. 21
- 14. Petiole longer than length of median propodeum (Fig. 85) .. *C. viridis* (Nees) (male) p. 29
 - Petiole at most as long as length of median propodeum 15
- 15. Postmarginal vein 3.0–3.5× as long as stigmal vein 16
 - Postmarginal vein 2.0–2.5× as long as stigmal vein 17
- 16. Petiole about as long as median propodeum; dorsellum usually excavated and divided in two parts by a median carina and hind part with a median incision (Fig. 69)
 - *C. entedonoides* (Walker) (female, male) p. 28
 - Petiole shorter than median propodeum; dorsellum convex to flat, without median incision and carina (Fig. 63) *C. anyite* (Walker) (female, male) p. 28
- 17. Hind coxa conspicuously long and slender, about 2.5× as long as wide (Fig. 52); petiolar foramen triangular *C. longicoxa* Hansson (male) p. 26
 - Hind coxa stouter, about 1.5× as long as wide; petiolar foramen semicircular to quadrangular 18



Figs. 1-8. Terminology. 1, *beckeri*, female: cc= costal cell; dm= dorsellum; m= marginal vein; ml= midlobe; msc= mesoscutum; om= occipital margin; OOL= ocell-ocular line; pc= propodeal callus; pet= petiolus; pm= postmarginal vein; POL= postocellar line; PPO= distance between hind ocelli and occipital margin; prm=

18. Petiole as long as wide (as in Fig. 77); femora usually pale—in a few specimens predominantly dark *C. avia* Hansson (female, male) p. 28
 – Petiole transverse (Fig. 80); femora always predominantly dark
 *C. phytomyzivora* Hansson (male) p. 20

19. Flagellum with apical three segments fused (Fig. 41)
 *C. inbrasmus* (Walker) (female, male unknown) 20
 – Flagellum with apical two segments fused 20

20. Forewing with a complete row of setae on underside of costal cell (as in Figs 48, 49) . .
 *C. robusta* Yoshimoto (female, male) p. 62
 – Costal cell without row of setae 21

21. Pronotal collar with transverse carina—at least on median pronotum (Fig. 87) 22
 – Pronotum without transverse carina (Fig. 86) 55

22. Flagellum yellow; frontal suture missing (Fig. 26) *C. walleyi* Yoshimoto (male) p. 60
 – Flagellum brown; frontal suture present 23

23. Petiole at least 1.5× as long as wide 24
 – Petiole at most as long as wide 26

24. Malar space very narrow, 1/15 the width of mouth opening (Fig. 92); frontal suture smoothly curved; with a procession between antennal toruli
 *C. prodice* (Walker) (female, male) p. 65
 – Malar space not as narrow, 1/7 the width of mouth opening (Fig. 93); frontal suture more straight; without procession between toruli 25

25. Occipital margin with a low sharp carina; propodeal callus with 2 (3) setae; female frons above fork usually with rather strong reticulation; male frons smooth or with weak reticulation *C. acoris* (Walker) (female, male) p. 64
 – Occipital margin rounded and smooth (in a few cases with a very weak carina); propodeal callus with 4–5 (3) setae; female frons above fork smooth or with very weak reticulation (male unknown) *C. amasis* (Walker) (female) p. 65

26. Propodeum with a strong and complete median carina (Fig. 58)
 *C. walleyi* Yoshimoto (female) p. 60
 – Propodeum without a complete median carina 27

27. Posteromedian part of propodeum with two submedian, slightly curved carinae (Fig. 70); male pedicel bright orange-yellow *C. gemma* (Walker) (female, male) p. 59
 – Posteromedian propodeum without carinae, or with 2–6 short and straight carinae (e.g. Fig. 73); male pedicel brown or whitish 28

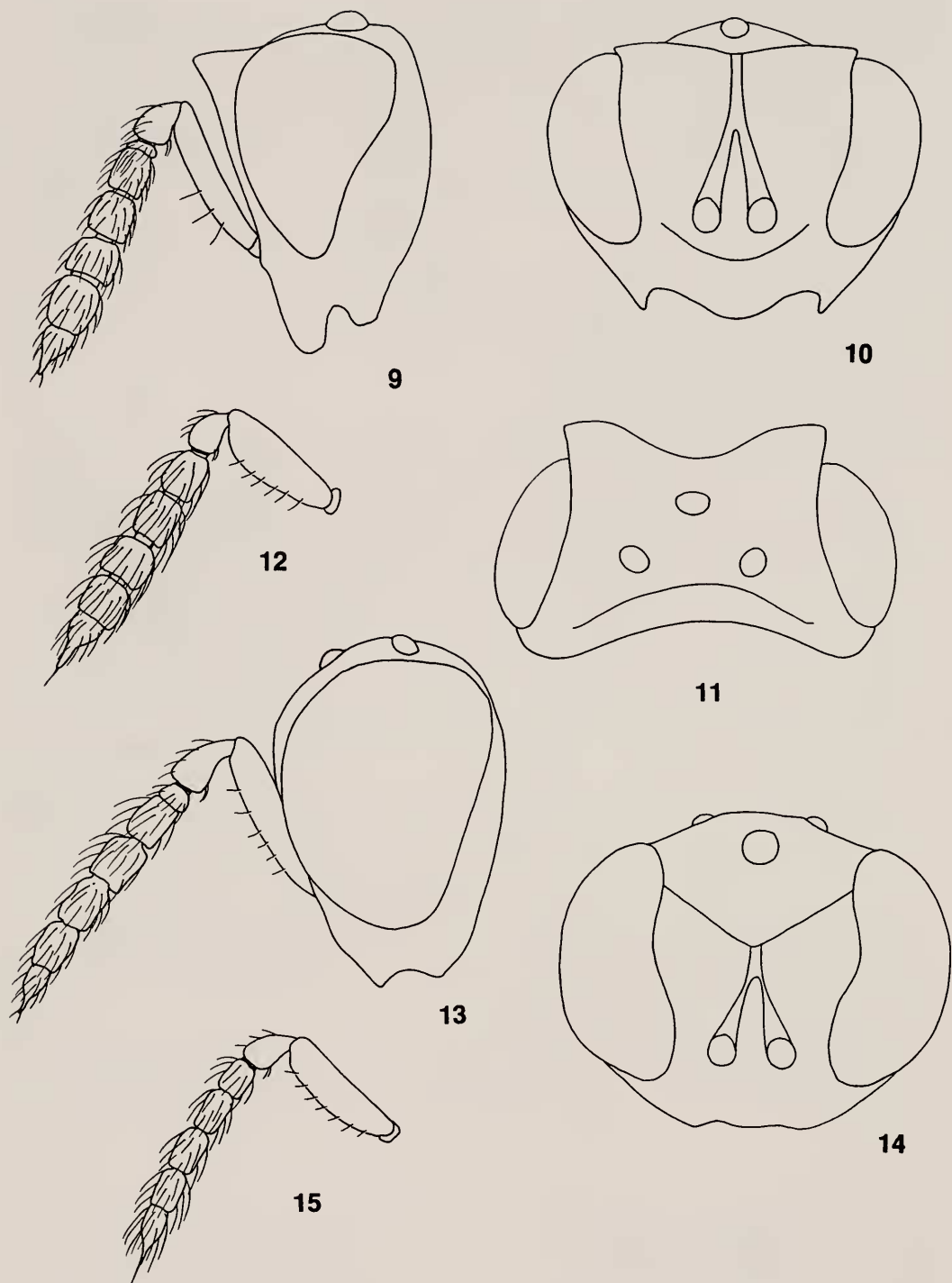
28. Anteromedian part of propodeum with a wide and strong median carina—reaching half the length of propodeum and then dividing into 2 weaker carinae which diverge towards the hind edge of propodeum (Fig. 73) *C. illustris* Graham (female) p. 59
 – Median carina on anteromedian part of propodeum weaker or missing 29

29. Clypeus partly or completely pale yellow 30
 – Clypeus completely dark and metallic 31

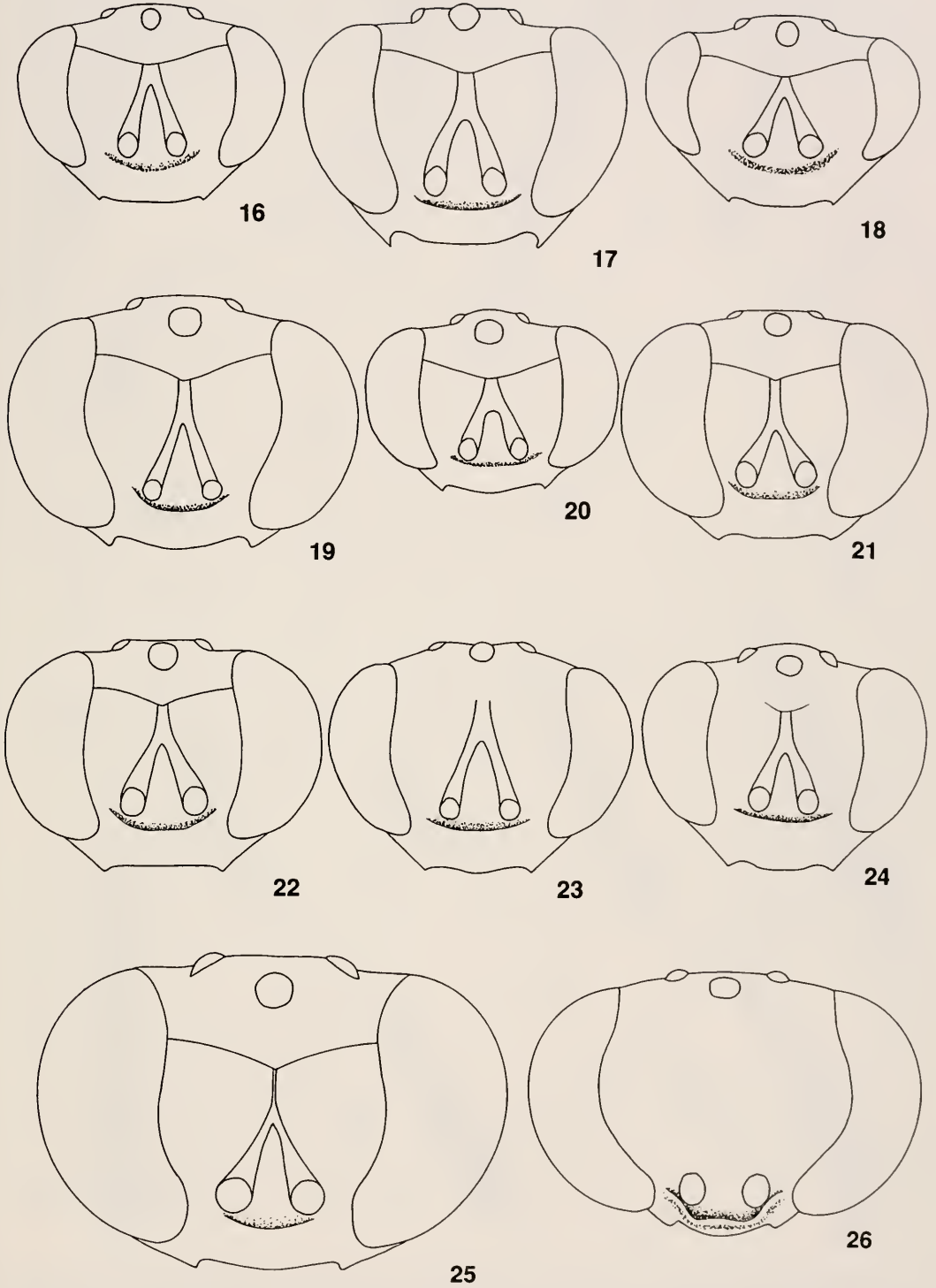
30. Reticulation on thoracic dorsum very dense and strong, almost like punctulation; propodeal callus with 5 setae *C. flaviclypeus* Hansson (female, male unknown) p. 63

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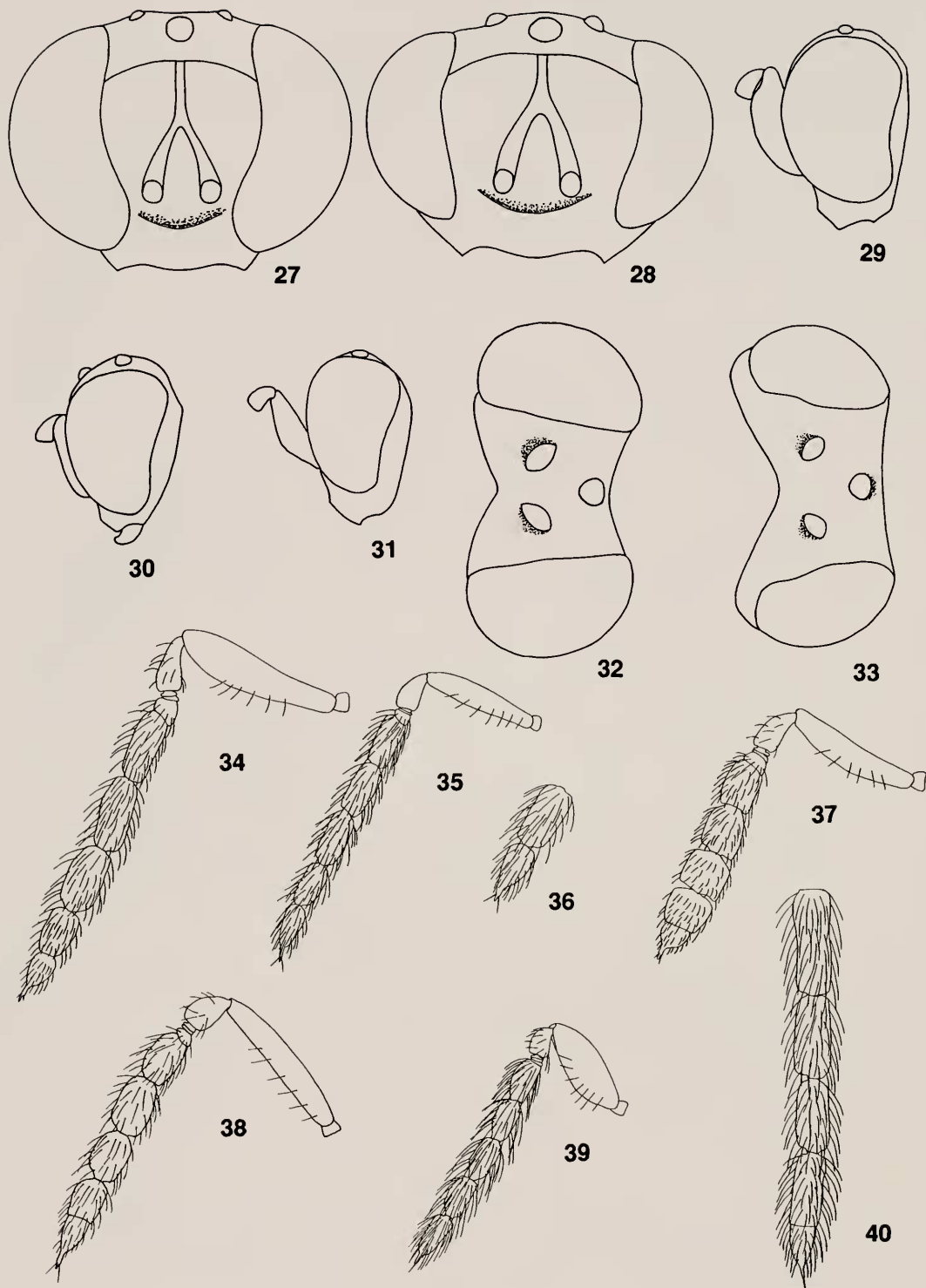
propodeum; prn= pronotum; s= stigmal vein; scu= scutellum; sl= sidelobe; spe= speculum; sul= spiracular sulcus. 2, *collaris*, female: pcl= pronotal collar. 3, Antenna, *compressicornis*, female: an= anelli; cla= clava; fla= flagellum; fun= funiculus; MPS= multiporous plate sensilla; pcl= pedicel; sca= scape. 4, Head, side view, *phytomyzivora*, female. 5, Head, front view, *clarkae* male: cly= clypeus; fs= frontal suture; he= height of eye; mo= width of mouth opening; ms= width of malar space; scr= antennal scrobes; tor= antennal toruli. 6, Mesothorax, side view, *longicoxa*, female: b= borderline between upper and lower mesepimeron. 7, Meso+metathorax, side view, *tristis*, female: b= as in Fig. 6; c₂= mid coxa; c₃= hind coxa; pc= propodeal callus. 8, *mediana*, female: pf= petiolar foramen.



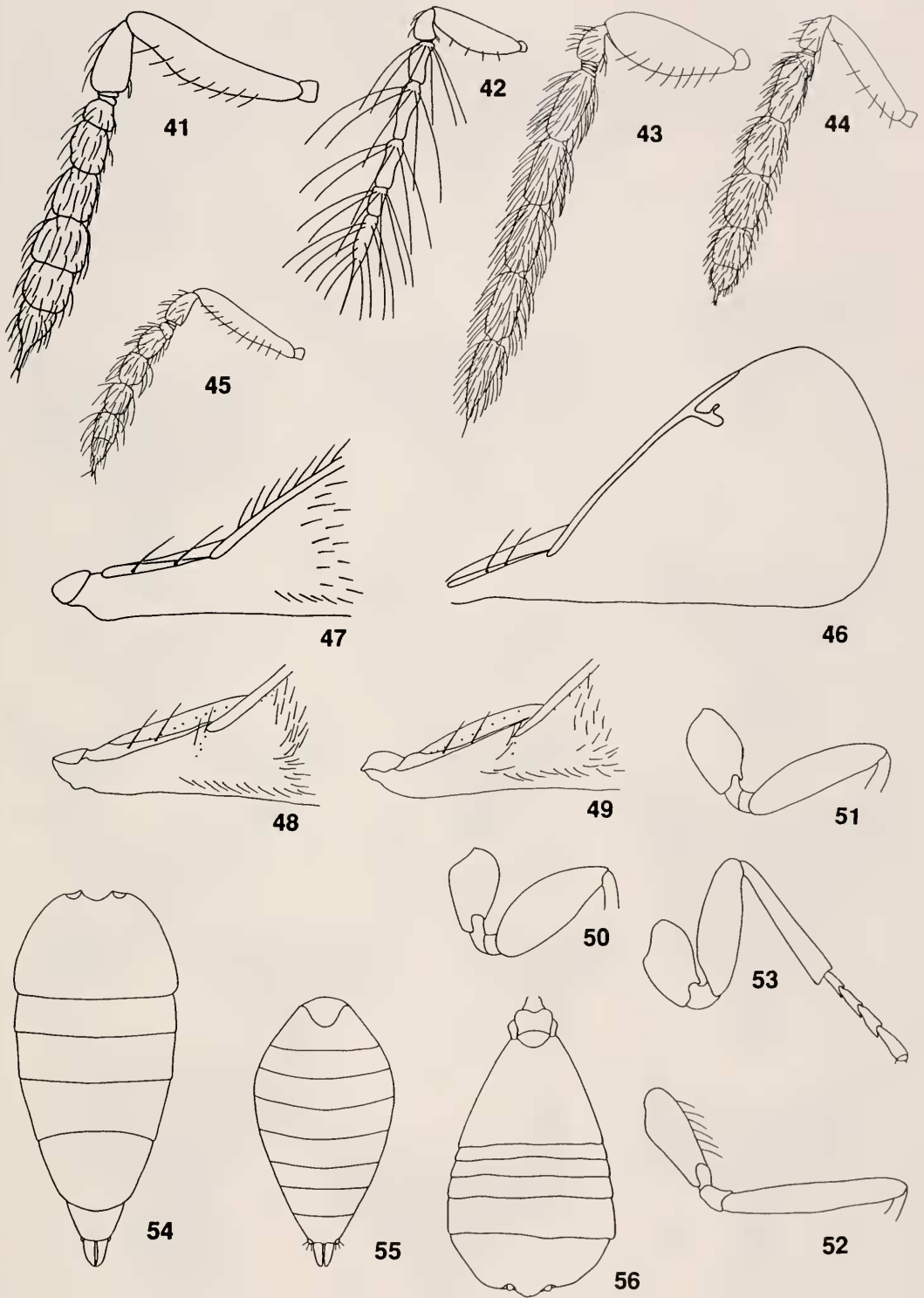
Figs. 9–15. *Chrysocharis* n.spp. 9–12. *cornigera*. 9, Head, side view, female. 10, Head, front view, female. 11, Head, dorsal view, female. 12, Antenna, male. 13–15. *wahli*. 13, Head, side view, female. 14, Head, front view, female. 15, Antenna, male.



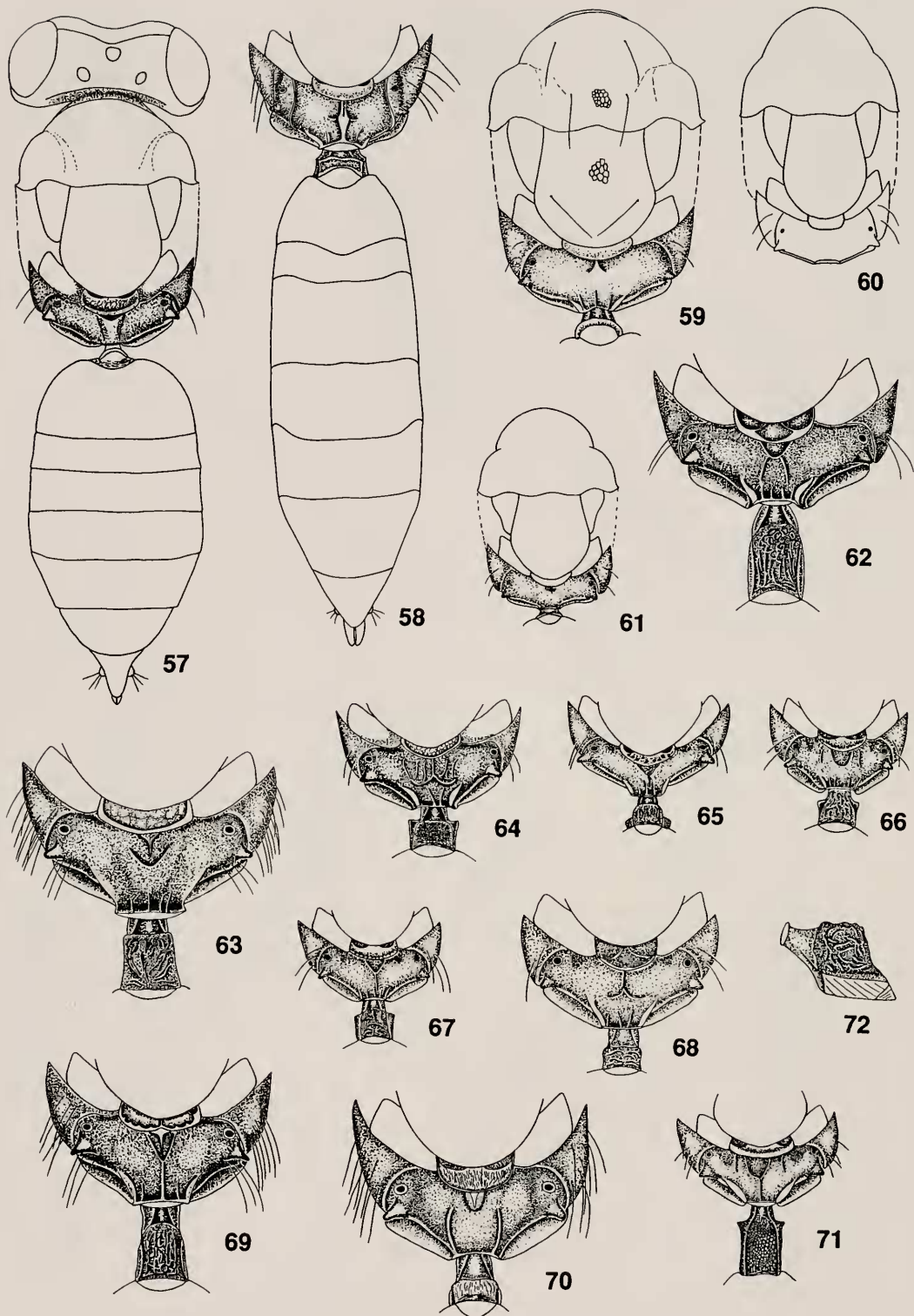
Figs. 16–26. Head, front view. 16–17, *ainsliei*, female. 18, Ditto, male. 19, *oscinidis*, female. 20, Ditto, male. 21, *chromatomyiae*, female. 22, Ditto, male. 23, *perditor*, female. 24, Ditto, male. 25, *anasis*, female. 26, *walleyi*, male.



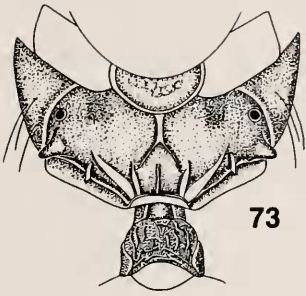
Figs. 27-40. 27, Head, front view, *tristis*, female. 28, Ditto male. 29, Head, lateral view, *coptodiscae*, male. 30, Ditto, *pallidigaster*, female. 31, Ditto, *submutica*, male. 32, Head, dorsal view, *occidentalis*, female. 33, Ditto, *coptodiscae*, female. 34-40. Antennae. 34, *occidentalis*, female. 35, *chilo*, female. 36, Apical 2 flagellar segments, *pilosa*, female. 37, *coptodiscae*, female. 38, *liriomyzae*, female. 39, Ditto, male. 40, Flagellum, *compressicornis*, male.



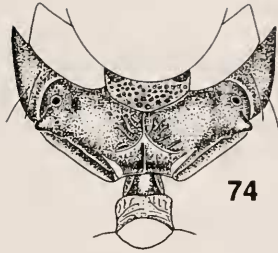
Figs. 41-56. 41-45. Antennae. 41, *imbrassus*, female. 42, *beckeri*, male. 43, *pubens*, male. 44, *polyzo*, female. 45, *prodice*, female. 46, Forewing, *paradoxa*. 47-49. Base of forewing. 47, *vonones*. 48, *pilosa*. 49, *chilo*. 50-52. Hindleg from coxa to basal tibia. 50, *occidentalis*. 51, *coptodiscæ*. 52, *longicoxa*. 53, Hindleg, *polita*. 54, Gaster, *laomedon*, female. 55, Ditto, *longigaster*, female. 56, Petiole + gaster, *illustris*, male.



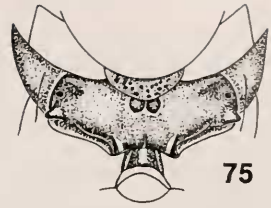
Figs. 57-72. 57, Body, dorsal view, *acutigaster*, female. 58, Propodeum+petiole+gaster, *walleyi*, female. 59-61. Mesosoma+petiole, female. 59, *occidentalis*. 60, *mediana*. 61, *polita*. 62-71. Propodeum+petiole, female. 62, *acoris*. 63, *amyite*. 64, *assis*. 65, *cerodonthae*. 66, *chromatomyiae*. 67, *clarkae*. 68, *crassiscapus*. 69, *entedonoides*. 70, *gemma*. 71, *giraulti*. 72, Petiole, side view, *clarkae*.



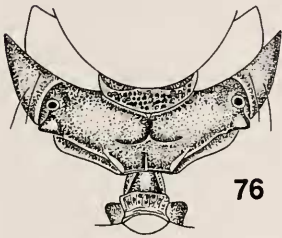
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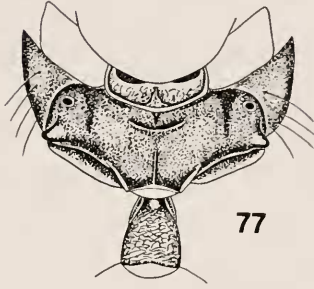
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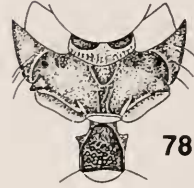
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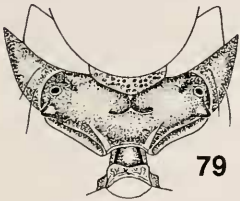
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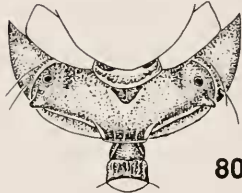
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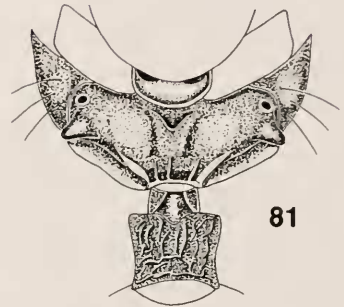
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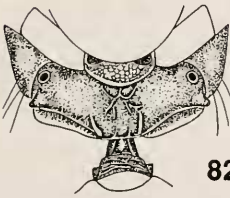
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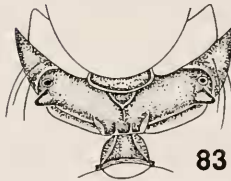
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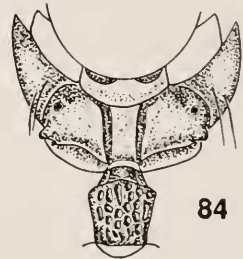
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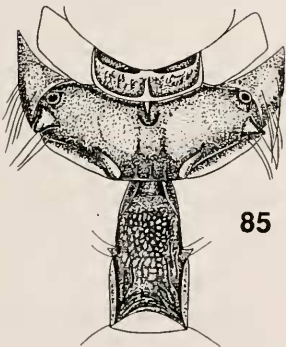
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Figs. 73-85. Propodeum+petiole, female. 73, *illustris*. 74, *laricinellae*. 75, *nephereus*. 76, *nitetis*. 77, *orbicularis*. 78, *oscinidis*. 79, *pentheus*. 80, *phytomyzivora*. 81, *polyzo*. 82, *pubicornis*. 83, *purpurea*. 84, *sulcata*. 85, *viridis*.

- Reticulation on thoracic dorsum weak; propodeal callus with 2 setae *C. aluta* Yoshimoto (female, male) p. 58
- 31. Anteromedian part of propodeum with a round to triangular fovea bordered by a raised edge (Fig. 83), fovea not divided by a median carina; propodeal callus with 3-4 setae *C. purpurea* Bukowski (female, male) p. 58
 - Anteromedian part of propodeum either with carinae shaped like a V, Y or a T (turned upside-down) (e.g. Figs 74, 76), or with two submedian pits (e.g. Fig. 75); propodeal callus with 2 setae 32
- 32. Females, i.e. gaster widest close to base or in the middle and with apex pointed or rounded (e.g. Figs 1, 54), scape comparatively narrow, 4.3-5.1× as long as wide 33
 - Males, i.e. gaster narrow at base and gradually becoming wider towards apex (Fig. 56), scape comparatively wide, 3.1-3.3× as long as wide 45
- 33. Gaster long—ratio length of mesosoma/length of gaster= 0.6-0.7—more or less parallel-sided and with hind part pointed (Fig. 54) 34
 - Gaster shorter—ratio m/g at the lowest 0.8 but usually 1.0—and oval-shaped with hind part rounded 35
- 34. Malar space very narrow—about 1/8 the width of mouth opening (Fig. 97); fore coxa predominantly pale *C. laomedon* (Walker) p. 57
 - Malar space wider—about 1/4 the width of mouth opening; fore coxa dark and metallic *C. elongata* (Thomson) (male unknown) p. 56
- 35. Scutellum with engraved reticulation; flagellum stout, flagellar segments gradually becoming shorter and wider towards apex (Fig. 37) *C. coptodiscae* Yoshimoto p. 53
 - Scutellum with raised reticulation; flagellum slender (e.g. Fig. 34) 36
- 36. Scutellum flattened; anteromedian part of propodeum with two submedian pits (Fig. 75) *C. nephereus* (Walker) p. 52
 - Scutellum convex; anteromedian part of propodeum with carinae shaped like a V, Y or a T 37
- 37. Transverse pronotal carina weak and present only on median part of pronotum 38
 - Transverse pronotal carina strong and present along the major part of pronotum 40
- 38. Hind femur conspicuously stout, 2.5× as long as wide (Fig. 50); malar space narrower than width of scape *C. occidentalis* (Girault) p. 54
 - Hind femur slender, 4.0× as long as wide (as in Fig. 51); malar space at least as wide as width of scape 39
- 39. Malar space as wide as width of scape (Fig. 30); frons below suture golden-red *C. pallidigaster* Hansson p. 49
 - Malar space 1.5-2.0× as wide as width of scape (Fig. 31); frons below suture usually purple *C. submutica* Graham p. 49
- 40. Malar space narrower than the width of scape 41
 - Malar space at least as wide as width of scape 42
- 41. Petiole as long as wide, with protruding forecorners (Fig. 64) *C. assis* (Walker) p. 64
 - Petiole transverse, without protruding forecorners (as in Fig. 79) *C. paradoxa* Hansson p. 58
- 42. Pronotal collar long (Fig. 2); occipital margin with a carina behind ocellar triangle *C. collaris* Graham p. 52
 - Pronotal collar shorter (Fig. 87); occipital margin without carina 43
- 43. Meshes of reticulation with about the same size over entire frons (Fig. 95); scutellum distinctly elongate—ratio length/width= 1.2 *C. laricinellae* (Ratzeburg) p. 50
 - Reticulation on frons below suture usually with larger meshes than on frons above suture (as in Fig. 96); scutellum about as long as wide 44
- 44. Raised surface of petiole small (Fig. 79); hind femur completely white or very pale brown at base *C. pentheus* (Walker) p. 51

- Raised surface of petiole larger (Fig. 76); hind femur usually predominantly dark
 *C. nitetis* (Walker) p. 51
- 45. Third anellus large (e.g. as in Fig. 37) *C. assis* (Walker) p. 64
 - Third anellus small and discoid 46
- 46. Gaster with a pale subbasal spot *C. pallidigaster* Hansson p. 49
 - Gaster without a pale subbasal spot 47
- 47. Malar space narrow—about 0.3× as wide as width of scape 48
 - Malar space wider—at least 0.5× as wide as width of scape 49
- 48. Propodeum with a complete median carina or with 2 weak, complete and parallel carinae
 *C. laomedon* (Walker) p. 57
 - Propodeum without longitudinal carinae *C. paradoxa* Hansson p. 58
- 49. Transverse carina along pronotum present and complete 50
 - Transverse carina along pronotum weak and incomplete 54
- 50. Scutellum flattened and about as long as wide; reticulation on scutellum small-meshed
 (Fig. 88) *C. nephereus* (Walker) p. 52
 - Scutellum distinctly longer than wide 51
- 51. Forewing subtruncate (as in Fig. 46) *C. paradoxa* Hansson p. 58
 - Forewing rounded apically 52
- 52. Eyes 4.5× as high as width of malar space (Fig. 94)
 *C. laricinellae* (Ratzeburg) (spring generation) p. 50
 - Eyes 5–7× as high as malar space (as in Fig. 96) 53
- 53. Entire frons with small-meshed reticulation (as in Fig. 95)
 *C. laricinellae* (summer generation) p. 50
 - Frons below suture with larger meshes than above suture (Fig. 96)
 *C. pentheus/C. nitetis* (inseparable) p. 51
- 54. Malar space as wide as width of scape; temples comparatively large and eyes compar-
 atively small, width of temples at lower edge of eyes 0.15× the height of an eye (Fig.
 31) *C. submutica* Graham p. 49
 - Malar space only 0.5× as wide as width of scape; temples smaller and eyes larger, width
 of temples at lower edge of eyes 0.07× the height of an eye (Fig. 29)
 *C. nephereus/C. coptodiscae* (inseparable) p. 52–53
- 55. Propodeum with two complete parallel submedian grooves (Fig. 84)
 *C. sulcata* (Hansson) (female, male)
 - Propodeum without complete longitudinal grooves 56
- 56. Petiole distinctly longer than wide (at least 1.4× as long as wide) 57
 - Petiole usually at most as long as wide 63
- 57. Frontal suture absent (Figs 23, 24) *C. perditor* Hansson (female, male) p. 38
 - Frontal suture present 58
- 58. Petiole with a pair of medio-lateral horns (Fig. 85); propodeum with 2–5 setae inside
 spiracular sulci *C. viridis* (Nees) (female) p. 29
 - Petiole with a pair of antero-lateral horns (Fig. 71); propodeum without setae inside
 spiracular sulci 59
- 59. Scape completely pale; postmarginal vein only 1.3× as long as stigmal vein
 *C. gibsoni* Hansson (female, male) p. 38
 - Scape with at least apical part infuscate; postmarginal vein 2× as long as stigmal vein 60
- 60. Frontal suture down-curved (Figs 27, 28); speculum open below (as in Fig. 47)
 *C. tristis* Hansson (female, male) p. 41
 - Frontal suture curved upwards or straight; speculum closed below (a few specimens
 have an open speculum) 61
- 61. Petiole at least 2× as long as wide *C. ignota* Hansson (female, male) p. 39
 - Petiole less than 2× as long as wide 62
- 62. Dorsellum comparatively short and wide, 6.5× as wide as long (Fig. 71); dorsal surface
 of petiole concave in sideview *C. giraulti* Yoshimoto (female, male) p. 35

- Dorsellum longer, 3× as wide as long (Fig. 78); dorsal surface of petiole straight in sideview *C. oscinidis* Ashmead (female, male) p. 34
- 63. Petiole pale, as long as wide 64
 - Petiole dark, as long as wide to transverse 65
- 64. Frontal suture almost straight; thoracic dorsum with weak reticulation
 - *C. minuta* (Hansson) (female, male)
 - Frontal suture V-shaped; thoracic dorsum with strong reticulation
 - *C. beckeri* Yoshimoto (female, male)
- 65. Clypeus pale yellow *C. flaviclypeus* Hansson (female, male unknown) p. 63
 - Clypeus dark and metallic 66
- 66. Mouth opening wider than height of an eye—ratio width of mouth/height of eye= 1.1
 - *C. kinamaensis* Hansson (female, male unknown) p. 45
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- 71. All femora usually predominantly dark and metallic; hind femur comparatively slender, 3.5× as long as wide; mesosoma comparatively slender, 1.6× as long as wide (Fig. 60)
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 - *C. polita* (Howard) (female, male) p. 48
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 - *C. mediana* Förster (female, male) p. 48
 - Femora completely pale; hind femur conspicuously stout, 3.2× as long as wide (Fig. 52); mesosoma comparatively stouter, 1.4× as long as wide (Fig. 61)
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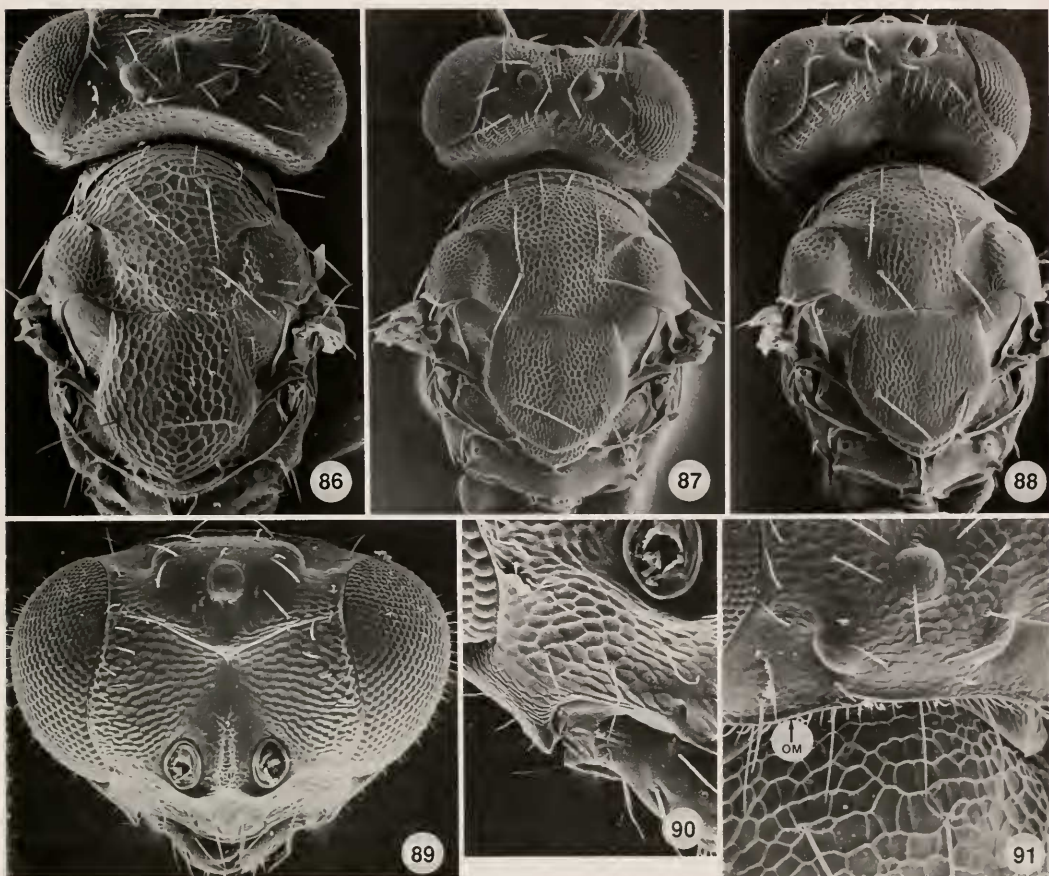
91. Flagellum thick, about 2× as wide as width of scape (Figs 3, 40); each flagellar segment with MPS in two transverse rows *C. compressicornis* Ashmead (female, male) p. 16
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 – Eyes and ocelli smaller, ratio height of eye/width of mouth= 1.7, distance between hind ocelli 3.4× width of one ocellus *C. sentenaca* n.sp.
98. Borderline between upper and lower mesepimeron curved (as in Fig. 6) *C. griffithsi* Hansson p. 17
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 – Scutellum convex *C. pallidigaster* Hansson p. 49
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104. Scutellum convex and 1.4× as long as wide; borderline between upper and lower mesepimeron curved (as in Fig. 6) *C. griffithsi* Hansson p. 17
 – Scutellum flattened and about as long as wide; borderline between upper and lower mesepimeron straight (as in Fig. 7) *C. nephereus* (Walker) p. 52

DESCRIPTIONS

Chrysocharis wahli n. sp. Figs 13–15

Type material.—Holotype female labelled “USA: California, Santa Barbara County, 18 mi. WNW Cuyama (T11N,

1228W, sect. 32), 1–7.iii.88, W.E. Wahl, MT”, in CNC. Paratypes: 5 females with same label-data as holotype; 3 females “USA: California, San Luis Obispo County, 6 mi SE Pozo, 1500’, 26.iii-9.iv.90, W.E. Wahl”; 1 female 2 males with same label as previous but collected 9–21.iv.90; 3 fe-



Figs. 86–91. 86–88. Head+mesosoma, dorsal view. 86, *liriomyzae*, female. 87, *nephereus*, female. 88, Ditto, male. 89–91. *liriomyzae*. 89, Head, front view. 90, Semicircular incision in lateral part of mouth opening. 91, Occipital margin (om).

males in LUZM, remaining in CNC; 1 male "USA: California, San Bernardino County, Summit Valley, 2mi. E Hwy 15, 28.v.1981, J Woolley 81/025" (TAMU).

Etymology.—Named after W.E. Wahl, who ran malaise-traps in California and thereby collected a large material of use to me and other taxonomists.

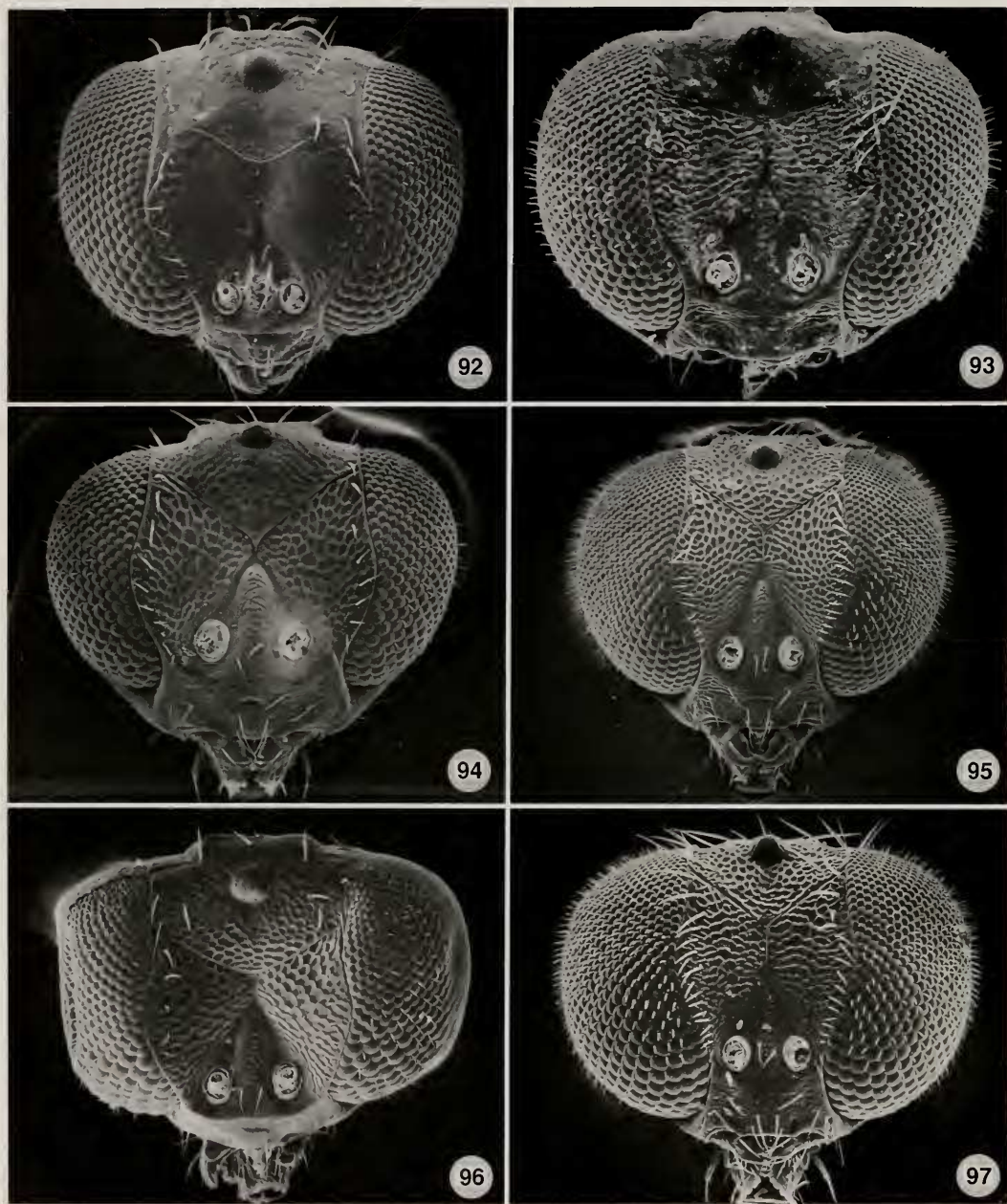
Diagnosis.—Forewing with an infuscate spot below stigmal vein; postmarginal vein short, as long as stigmal vein; anteromedian part of propodeum smooth; male pedicel pale.

Description.—Length of body: Female= 1.2–1.6 mm, male= 0.9 mm.

Head: Scape pale, remaining antenna

dark; male pedicel pale. Apical 2 segments of flagellum fused (Figs 13, 15). HE/MS/MO female: 4.6/1.0/2.2, male: 3.0/1.0/1.9. Malar space 1.5× as wide as width of scape in both sexes. Frons golden-green, with strong and small-meshed reticulation. Frontal suture V-shaped. Vertex metallic greenish-blue, with strong and small-meshed reticulation. Inner orbit of eye with 1 row of setae. POL/OOL/POO: 2.2/1.0/1.2. Occipital margin rounded. Ratio width of head/width of thorax across posterior mesoscutum= 1.1.

Mesosoma: Pronotum without transverse carina. Mesoscutum and scutellum metallic greenish-blue; with strong and



Figs. 92-97. Head, front view. 92, *prodice*, female. 93, *amasis*, female. 94, *laricinellae*, male, spring generation. 95, Ditto, female, summer generation. 96, *pentheus*, male. 97, *laomedon*, female.

small-meshed reticulation; scutellum flattened and about as long as wide. Dorsellum small and convex, $3.4\times$ as wide as long, with strong reticulation. Borderline between lower and upper mesepimeron

weakly curved. All coxae dark and metallic (fore coxa in some specimens pale with dark metallic base) with weak reticulation; femora and tibiae pale; tarsi pale with 4th segment dark. Forewing with an infuscate

spot below stigmal vein, rounded with speculum closed, and with a narrow costal cell. Ratios length of M/PM/S: 4.4/1.0/1.0. Propodeum golden-green; anteromedian part smooth; surface with weak reticulation; propodeal callus with 2 setae. Petiolar foramen semicircular.

Metasoma: Petiole very short, in dorsal view visible only as a narrow and smooth strip (as in Fig. 75). Gaster golden-green or golden-purple; male with a small pale subbasal spot; with strong and small-meshed reticulation; oval-shaped in female. Ratio length of mesosoma/length of gaster female = 0.8–0.9, male = 1.0–1.2.

Distribution.—USA (California).

Remarks.—This species belongs in the *mediana*-group, it shares the narrow costal cell in forewing and the smooth anteromedian part of propodeum with the other species in the group.

Chrysocharis cornigera n. sp.

Figs 9–12

Type material.—Holotype female labelled "Canada: Alberta, 14 km S S. Saskatchewan River, 1.vi.1981, Thormin, Reaney & Brouwer, sand dune complex", in CNC. Paratypes: 8 females 12 males with same label-data as holotype, 3 females 5 males in coll. LUZM, remaining in CNC.

Etymology.—*cornigera* is latin and means "with horns".

Diagnosis.—Lateral parts of frons, including frontal suture, considerably raised to form 2 conspicuous horns (Figs 9–11); clypeus semicircularly protruding; mouth opening with a semicircular incision below eye—mandibles are possible to point straight forward when fitted in these incisions; postmarginal vein short, as long as stigmal vein; propodeal callus with three setae.

Description.—Length of body: Female = 0.9–1.3 mm, male = 1.1–1.3 mm.

Head: Entire antenna dark. Flagellum with 2 apical segments fused (Figs 9, 12). HE/MS/MO female: 4.8/1.0/3.6, male: 2.8/1.0/2.3. Clypeus semicircularly pro-

truding; mouth opening with a semicircular incision below eye. Malar space $1.5\times$ as wide as width of scape in both sexes. Frons below suture golden-purple in female, golden-green in male, both sexes with weak reticulation. Frontal suture straight; lateral parts of frons, including frontal suture, considerably raised to form 2 conspicuous horns (Figs 9–11). Frons above suture and vertex golden-green, golden-red or golden-blue, with weak reticulation. Inner orbit of eye with 1 row of setae. POL/OOL/POO: 2.6/1.8/1.0. Occipital margin with a weak edge. Ratio width of head/width of thorax across posterior mesoscutum = 1.2.

Mesosoma: Pronotum without transverse carina. Mesoscutum and scutellum golden-green, golden-blue or golden-red—scutellum in some specimens with anterior half purplish; with rather strong to weak reticulation. Dorsellum convex to flat, smooth and with 2 anterolateral foveas. Borderline between lower and upper mesepimeron straight. All coxae dark and metallic with strong reticulation. Femora with basal $\frac{1}{2}$ to $\frac{2}{5}$ dark, with apical part pale; tibiae pale; tarsi pale with 4th segment dark. Wings hyaline; forewing rounded with speculum closed. Ratios length of M/PM/S: 6.1/1.0/1.0. Propodeum golden-green; anteromedian part with a small semicircular fovea; surface with rather strong to weak sculpture/reticulation; propodeal callus with 3 setae. Petiolar foramen semicircular.

Metasoma: Petiole slightly transverse (as in Fig. 68). Gaster golden-green; oval-shaped in female. Ratio length of mesosoma/length of gaster both sexes = 0.8–0.9.

Distribution.—Canada (Alberta).

Remarks.—This species comes closest to *pubicornis*-group, but differs from the species in this group in the short postmarginal vein and the protruding lateral parts of frons. Therefore I am not prepared to place *cornigera* in this, or any other, group, but regard it as *species sola*.

Chrysocharis sentenaca n. sp.

Type material.—Holotype female labelled "USA: California, San Diego County, Sentenac Canyon, 22.iv.1981, J. Woolley 81/011", in TAMU. Paratypes: 1 female 4 males with same label-data as holotype, 1 female 2 males in coll. LUZM, remaining in TAMU.

Etymology.—Named after place where type specimens were collected, Sentenac Canyon in California.

Diagnosis.—Thoracic dorsum flattened; ocelli small.

Description.—Length of body: Female= 1.1–1.3 mm, male= 0.9 mm.

Head: Entire antenna dark. Apical 2 segments of flagellum fused. HE/MS/MO both sexes: 3.6/1.0/2.2. Malar space 1.5× as wide as width of scape in female and 1.0× in male. Frons metallic purple below suture, metallic greenish-blue above, with strong and small-meshed reticulation. Frontal suture V-shaped. Vertex golden-green, with weak and small-meshed reticulation. Inner orbit of eye with 1 row of setae. POL/OOL/POO: 2.8/1.0/1.3. Occipital margin rounded. Ratio width of head/width of thorax across posterior mesoscutum= 1.2.

Mesosoma: Pronotum without transverse carina. Mesoscutum and scutellum golden-green; with rather strong and small-meshed reticulation on mesoscutum, weaker on scutellum; scutellum about as long as wide. Dorsellum large, 2.9× as wide as long, and almost flat, with weak reticulation. Borderline between lower and upper mesepimeron weakly curved. All coxae dark and metallic with weak reticulation. Femora and tibiae pale; tarsi pale with 4th segment dark; except weakly infuscate fore tibiae and tarsi. Forewing hyaline, rounded with speculum closed, and with a narrow costal cell.

Ratios length of M/PM/S: 4.1/1.8/1.0. Propodeum golden-green; anteromedian part with a small and weak fold; surface with weak reticulation; propodeal callus with 2 setae. Petiolar foramen semicircular.

Metasoma: Petiole very short, in dorsal view visible only as a narrow and smooth strip (as in Fig. 75). Gaster golden-green or golden-purple; oval-shaped in female. Ratio length of mesosoma/length of gaster female= 0.8–0.9, male= 0.9.

Distribution.—USA (California).

Remarks.—*C. sentenaca* belongs to *pentheus*-group and hence has the characters diagnostic for that group (Hansson 1987: 49) and is similar to *C. submutica*.

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LITERATURE CITED

- Hansson, C. 1985. Taxonomy and biology of the Palearctic species of *Chrysocharis* Förster, 1856 (Hymenoptera: Eulophidae). *Entomologica Scandinavica Supplement* No. 26:1–130.
- Hansson, C. 1986. A revision of the Nearctic species of the genus *Zaonmomyia* Ashmead (Hymenoptera: Eulophidae). *Proceedings of the Entomological Society in Washington* 88:244–252.
- Hansson, C. 1987. Revision of the New World species of *Chrysocharis* Förster (Hymenoptera: Eulophidae). *Entomologica Scandinavica Supplement* No. 31:1–86.
- Hansson, C. 1990. A taxonomic study on the Palearctic species of *Chrysonotomyia* Ashmead and *Neochrysocharis* Kurdjumov (Hymenoptera: Eulophidae). *Entomologica Scandinavica* 21:29–52.
- Hansson, C. In press. Revision of the Nearctic species of *Neochrysocharis* Kurdjumov (Hymenoptera: Eulophidae). *Entomologica Scandinavica*.
- Schauff, M.E. 1991. The Holarctic genera of Entedoninae (Hymenoptera: Eulophidae). *Contributions of the American Entomological Institute* 26(4):1–109.